UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,651	12/13/2000	Bart Dierickx	522-1729	8263

7590 06/02/2004

William M. Lee, Jr.
Barnes & Thornburg
Sweeney & Ohlson
P.O. Box 2786
Chicago, IL 60690-2786

EXAMINER	
LEE, EUGENE	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/736,651	DIERICKX, BART	
	Examin r	Art Unit	
	Eugene Lee	2815	

-- The MAILING DATE of this communication appears n the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 6-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/5/04 has been entered.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the regions of a second conductivity type in or on the substrate avoiding touching of the region for collecting but not storing carriers (claim 9) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 7, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Chi et al. 5,608,243. Chi discloses (see, for example, FIG. 2B) an active pixel sensor cell (pixel structure) comprising a p-substrate (semiconductor substrate) 110, image collection region (a region in the substrate for collecting but not storing carriers) 114, source region (one doped or inverted region) 106, and channel region (at least one planar current flow, carrier transport pathway) 112. Regarding the limitation "a region in the substrate for collecting but not storing carriers", see column 3, lines 52-54 wherein Chi states the junction between the p+ region 114 and drain region 108 forms a photodiode for collecting charges and then states in column 3, lines 61-64, that these charges are swept to the drain region 108 due to a built-in electric field in the junction. Regarding the limitation "radiation sensitive source of carriers in the substrate", see column 3, lines 55-60 wherein Chi states that photons strike the surface of p+ region 114 and, as a result, create a number of electron-hole pairs. Regarding claim 8, see n-well 108.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chi et al. '243 as applied to claims 1, 7, 8 and 10 above, and further in view of Takemoto et al. 4,148,048. Chi does not disclose a polysilicon cover layer. However, it was extremely well known in the art

at the time of invention that polysilicon is one of many conductive materials used in the gate layers of a semiconductor device. Takemoto discloses (see, for example, column 27-33) a gate layer made of polycrystalline silicon layer (polysilicon). It would have been obvious to one of ordinary skill in the art at the time of invention to use polysilicon in the gate layers of Chi in order to have a conductive gate material for applying voltage in the active pixel sensor cell. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 9, Chi does not disclose regions of a second conductivity type in or on the substrate avoiding touching of the region for collecting but not storing carriers. However, Takemoto discloses (see, for example, FIG. 4) a p+ diffused layer (regions of a second conductivity type in or on the substrate) 30. In column 6, lines 1-8, Takemoto states that the p+ diffused layer is used as an ohmic contact for setting potentials in regions of a semiconductor device. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the p+ diffused layer in Chi's invention in order to bias a region for conducting current in the active pixel sensor cell.

Further regarding claim 9, Chi does not disclose a field oxide. However, Takemoto discloses (see, for example, FIG. 4) a SiO_2 film (field oxide) 26'. In column 14, lines 24-26, Takemoto states that a SiO_2 film serves as an isolation region. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the SiO_2 film (field oxide) of Takemoto in Chi's invention in order to isolate the active pixel sensor cell from other devices.

Response to Arguments

7. Applicant's arguments filed 4/5/04 have been fully considered but they are not persuasive.

Regarding applicant's argument on page 8, first paragraph that there is a fundamental difference between the present invention and the prior art; according to the present invention charges are only stored at the end readout location, in Chi charges are stored in an intermediate location which is different from the readout location, this argument is not persuasive. In FIG. 2B, Chi discloses the charges are stored in the one doped or inverted region 106 and read out by the sense amplifier SA. The charges that form the current are not stored in an intermediate location but reside in a drain region 108. When a voltage is applied to the control gate 118, a current is formed and flows from the drain region to the source region. This current of Chi is formed in the same manner as the applicant's invention. On page 8, lines 16-24, applicant states that the channel region is formed by biasing a gate electrode high and a conducting pathway is created in the transport region 5. The charges travel from the carrier collecting region to the doped region and is read out by detection circuitry.

It should also be noted that the new limitation "during image integration" does not add any new structural limitations to the applicant's claims. It does not structurally differentiate the applicant's invention from Chi's invention.

In general, channel regions do not store carriers. Channel regions are formed by inverting a substrate which allow carriers to **flow** from one region to another. They do not hold or store carriers.

INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
May 26, 2004

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800